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SCIENTIFIC ARTICLE

Fetoscopic tracheal occlusion for severe congenital diaphragmatic hernia: retrospective study☆

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KEYWORDS
Congenital diaphragmatic hernia;
Prenatal diagnosis;
Tracheal occlusion;
Fetoscopy;
Fetal surgery;
Anesthesia

Abstract
Background and objectives: The temporary fetal tracheal occlusion performed by fetoscopy accelerates lung development and reduces neonatal mortality. The aim of this paper is to present an anesthetic experience in pregnant women, whose fetuses have diaphragmatic hernia, undergoing fetoscopic tracheal occlusion (FETO).
Method: Retrospective, descriptive study, approved by the Institutional Ethics Committee. Data were obtained from medical and anesthetic records.
Results: FETO was performed in 28 pregnant women. Demographic characteristics: age 29.8 ± 6.5; weight 68.64 ± 12.26; ASA I and II. Obstetric: IG 26.1 ± 1.10 weeks (in FETO); 32.86 ± 1.58 (reversal of occlusion); 34.96 ± 2.78 (delivery). Delivery: cesarean section, vaginal delivery. Fetal data: Weight (g) in the occlusion and delivery times, respectively (1045.82 ± 222.2 and 2294 ± 553); RPC in FETO and reversal of occlusion: 0.7 ± 0.15 and 1.32 ± 0.34, respectively. Preoperative maternal anesthesia included ranitidine and metoclopramide, nifedipine (VO) and indomethacin (rectal). Preanesthetic medication with midazolam IV. Anesthetic techniques: combination of 0.5% hyperbaric bupivacaine (5–10 mg) and sufentanil; continuous epidural predominantly with 0.5% bupivacaine associated with sufentanil, fentanyl, or morphine; general. In 8 cases, there was need to complement via catheter, with 5 submitted to PC and 3 to BC. Thirteen patients required intraoperative sedation; ephedrine was used in 15 patients. Fetal anesthesia: fentanyl 10–20 mg kg^{-1} and pancuronium 0.1–0.2 mg kg^{-1} (IM). Neonatal survival rate was 60.7%.

☆ This work realized at the Departamento de Anestesiologia da Faculdade de Ciências Médicas da Universidade Estadual de Campinas (Unicamp), Campinas, SP, Brasil.

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Conclusion: FETO is a minimally invasive technique for severe congenital diaphragmatic hernia repair. Combined blockade associated with sedation and fetal anesthesia proved safe and effective for tracheal occlusion.

PALAVRAS-CHAVE
Hérnia diafragmática congênita;
Diagnóstico pré-natal;
Oclusão traqueal;
Fetoscopia;
Cirurgia fetal;
Anestesia

Oclusão traqueal por fetoscopia em hérnia diafragmática congênita grave: estudo retrospectivo

Resumo
Justificativa e objetivos: A oclusão traqueal fetal temporária feita por meio da fetoscopia acelera o desenvolvimento pulmonar e reduz a mortalidade neonatal. O objetivo deste trabalho é apresentar experiência anestésica em gestantes cujos fetos eram portadores de hérnia diafragmática e foram submetidos à oclusão traqueal por fetoscopia (FETO).
Método: Estudo retrospectivo, descritivo, aprovado pelo Comitê de Ética da Instituição. Os dados foram obtidos das fichas anestésicas e dos prontuários.
Resultados: A FETO foi feita em 28 gestantes. Características demográficos: idade 29,8 ± 6,5; peso 68,64 ± 12,26; ASA 1 e 2. Obstétricas: IG 26,1 ± 1,10 semana (na FETO); 32,86 ± 1,58 (desoclusão); 34,96 ± 2,78 (parto). Via de parto: cesárea, parto vaginal. Dados fetais: peso (g) nos momentos da oclusão e nascimento, respectivamente (1.045,82 ± 222,2 e 2294 ± 553); RPC na FETO e desoclusão: 0,7 ± 0,15 e 1,32 ± 0,34, respectivamente. Anestesia materna: pré-operatório incluiu ranitidina e metoclopramida; nifedipina (VO) e indometacina (retal). Medicação pré-anestésica com midazolam EV. Técnicas anestésicas: bloqueio combinado com bupivacaína 0,5% hiperbárica 5-10 mg associada ao sufentanil; peridural contínua predominantemente com bupivacaína 0,5% associada a sufentanil, fentanil ou morfina; geral. Em oito casos houve necessidade de complementação pelo cateter, cinco nas submetidas a PC e três a BC. No intraoperatório 13 pacientes necessitaram de sedação; efedrina foi usada em 15 pacientes. Anestesia fetal: fentanil 10 a 20 mg·kg^{-1} e pancurônio 0,1-0,2 mg·kg^{-1} (IM). A taxa de sobrevida neonatal foi de 60,7%.
Conclusão: A FETO constitui técnica minimamente invasiva para correção de hérnia diafragmática congênita grave. O bloqueio combinado associado à sedação e anestesia fetal se mostrou seguro e eficaz para a oclusão traqueal.

Introduction

Advances in prenatal diagnostic tools, such as high-resolution ultrasound and biochemical and cytogenetic analysis of fetal amniotic fluid and blood, more often have enabled the diagnosis and early correction of birth defects, delayed its evolution and prevented it from becoming irreversible.[1–4]

Numerous studies have shown that the main causes of death in fetuses with diaphragmatic hernia are pulmonary hypoplasia and pulmonary hypertension, but they can benefit significantly with intrauterine therapy. However, problems of open surgery, such as preterm labor and premature rupture of membranes, are obstacles to the success of this procedure and resulted in the development of minimally invasive techniques performed by fetoscopy.[5–9]

The aim of this paper is to present the initial experience and viability of fetoscopic tracheal occlusion (FETO) and anesthetic experience in pregnant women whose fetuses had severe diaphragmatic hernia.

Method

Retrospective descriptive study performed at the *Hospital da Mulher Professor Doutor José Aristodemo Pinotti* (CAISM – Unicamp). After approval by the institutional Ethics Committee, data collection was based on review of anesthetic and obstetric records. The waiver of informed consent was requested from the aforementioned committee (Code of Medical Ethics – Resolution 196). From May 2007 to May 2012, pregnant women whose fetuses presented with congenital diaphragmatic hernia (CDH) were included in the study. The procedure performed was the temporary fetoscopic tracheal occlusion (FETO) with inflatable balloon, and the inclusion criteria for the procedure indication were: fetuses with severe diaphragmatic hernia characterized by liver herniation into the chest, lung-to-head ratio (LHR < 1); gestational age less than 27 completed weeks at the time of the diagnosis confirmation; no other major fetal structural anomalies (requiring postnatal surgical repair); and absence of fetal chromosomal abnormalities incompatible

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